FRYINGPAN CREEK BRIDGE
Mount Rainier National Park
Spanning Fryingpan Creek on Yakima Park Highway
Longmire vicinity
Pierce County
Washington

HAER No. WA-54

PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

REDUCED COPIES OF MEASURED DRAWINGS

HISTORIC AMERICAN ENGINEERING RECORD
National Park Service
U.S. Department of the Interior
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Mount Rainier National Park
HAER WA-54

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I. INTRODUCTION

Location:	Spanning Fryingpan Creek on Yakima Park Highway (White River Road), Mount Rainier National Park, Pierce County, Washington. Quadrangle: White River Park, Wash. UTM: 10/606000/5193475
Date of Construction:	1930-1931
Structure type:	Three-hinged steel arch girder bridge
FHwA Structure No.:	9450-027P
Designer and Engineer:	Western Office, Bureau of Public Roads, San Francisco, California
Resident Engineer:	W. T. Utz, Bureau of Public Roads
Contractor:	Albert F. Berni, Portland, Oregon
Owner:	Mount Rainier National Park, National Park Service
Use:	Park highway bridge
Significance:	Fryingpan Creek Bridge is an uncommon example of a three-hinged steel web girder bridge in a park generally featuring stone-faced reinforced concrete bridges. The abutments and spandrel walls are stone-faced in the characteristic "Rustic Style" frequently employed by the National Park Service.
Project Information:	Documentation of the Fryingpan Creek Bridge is part of the Mount Rainier National Park Roads and Bridges Recording Project, conducted in summer 1992 by the Historic American Engineering Record. Richard H. Quin, Historian, 1992

II. HISTORY

This is one in a series of reports prepared for the Mount Rainier National Park Roads and Bridges Recording Project. HAER No. WA-35, MOUNT RAINIER NATIONAL PARK ROADS AND BRIDGES, contains an overview history of the park roads. In addition, HAER No. WA-126, YAKIMA PARK HIGHWAY, contains more specific information on the road on which the Dry Creek Bridge is located.

Yakima Park Highway

The Yakima Park Highway, built between 1927 and 1931, replaced the old White River Road to Glacier Basin built by mining interests in the 1910s, and continued up the northeast shoulder of Mount Rainier to the high subalpine meadows at Yakima Park (Sunrise). The road was surveyed and constructed under the supervision of the Bureau of Public Roads (BPR), which in 1925 assumed responsibility for major road projects in the national parks.

The 15.5-mile Yakima Park Highway leaves the Mather Memorial Parkway [HAER No. WA-125] at the "White River Wye," five miles south of the northeast park entrance and three miles north of Cayuse Pass. The road runs southwest for four miles, crossing rustic style bridges at Dry (Deadwood) Creek [HAER No. WA-49] and Klickitat Creek [HAER No. WA-50] and a plain steel girder and reinforced concrete replacement span over Shaw Creek. The road then makes a looping curve to cross the Fryingpan Creek Bridge and swings northwest another mile to the White River Bridge [HAER No. WA-53]. From this point, a graveled road provides access to the White River Campground and the Glacier Basin trail. The main road begins to climb a series of switchbacks to Sunrise Point, where it makes a final swing to the west to reach the Sunrise development at Yakima Park. Sunrise is the highest point (elev. 6,450') reached by the park road system.

Fryingpan Creek Bridge

The 1930s Yakima Park Highway crosses Fryingpan Creek on sturdy three-hinged steel arch girder bridge. Most other bridges in Mount Rainier National Park from the same period, including the two other principal spans on the road, are reinforced concrete arch structures faced with native stone veneers. This is the only historic exposed steel bridge in the park.

The source of Fryingpan Creek is the Fryingpan Glacier, located two-and-one-half miles above the bridge. Due to the glacial source, the stream flow is very erratic, varying from a trickle to a torrent. The stream passes down a steep (6 percent grade) braided channel subject to considerable change; park records indicate that the stream has changed channels three times in one 24-hour period.[1]

The location survey report for the White River Road stated that the chosen crossing for Fryingpan Creek, while the best available, was considerably longer than might be expected for a stream of such size. While the eastern bank was quite substantial and protected by a rocky point on the upstream side, the western bank was less protected and subject to erosion. Abutments with heavy wing walls, along with some use of riprap, would be required.[2]

The bridge site was inspected in November 1927 by Park Superintendent O. A. Tomlinson, National Park Service Landscape Engineers Thomas C. Vint and Ernest A. Davidson, and Engineer C. R. Short of the Bureau of Public Roads (BPR).[3] The bridge was then designed by the BPR, which in 1925 took responsibility for major park road projects. Preliminary plans for the bridge were sent to the park in February 1928.[4]

While the main construction drawings were prepared by the Bureau of Public Roads, the sheets of architectural details were prepared by the National Park Service Landscape Engineering Division. The Division forwarded for review three sets of plans, two of concrete construction and one of stone-faced concrete construction. Copies were also sent to the Bureau of Public Roads for adaptation for the final construction drawings.[5]

In April 1928, National Park Service Chief Landscape Engineer Thomas Vint directed that the structure be constructed of exposed concrete instead of masonry-faced concrete, owing to an estimated $15,000 additional cost required for masonry arch construction. He also directed that the bridge be planned without sidewalks or bridle paths.[6] New plans for the bridge were received in the park in March 1930. Unlike the earlier proposals, the BPR now proposed a steel web arch girder structure. The plans were approved by Superintendent Tomlinson and by the Landscape Architecture Division.[7]

Bids for the project were opened on 16 July 1930 at the Portland, Oregon office of the District Engineer of the Bureau of Public Roads. Albert F. 8erni of Portland was recommended for the contract on the basis of his low bid of $54,259.20.[8]

Work began at the end of July under Berni's personal supervision. The contractor began by erecting a "high-line" or aerial tram over the center of the bridge site to transport all equipment. Even large trucks and concrete mixers were carried across. The stone masonry for the spandrel walls, too heavy to place by hand, was also set in place by the high-line. Some concrete was also poured with this equipment; the rest was wheeled to the site. A screening and washing plant for the concrete was constructed near the center of the channel below the bridge. Coarse aggregate and sand were obtained at the site. Granite for the rubble masonry was obtained from a quarry a mile away from the site.[9]

Site work began with excavation for the abutments and accompanying retaining walls. Some 677 cubic yards of material were removed from 10'-14' below the stream bed. The excavation was taken down to very compact gravel and sand material, considered very satisfactory for the footings. The top portions of the main foundations were dug with steam shovels and the lower portions by hand. Considerable water was encountered below stream level and was removed by pumps.[10]

With the excavations complete, formwork was constructed and concrete was poured for the two abutments. Masonry walls were then built to the sides of the abutments, and concrete side walls were poured against the masonry. The resulting work gives the appearance of a solid approach on masonry walls and gives no outside evidence of the hollow, concrete approach abutments. As much of the concrete was poured during cold weather, it was necessary to heat water for mixing the concrete and to cover the new concrete with canvas covers with heat underneath. Construction operations for the 1930 season were halted by winter weather on 12 November, and the work resumed on 7 July 1931.[11]

Structural steel was erected on falsework. The steel had been fabricated in Seattle by the Wallace Bridge and Structural Steel Company and was hauled to the site on trucks. No problems were encountered in placing the massive riveted angle and plate members, but the subsequent painting was difficult, again on account of cold weather. Once the steel work was complete, the concrete deck slab was poured.[12]

A nearby approach roadway cut of 7,750 cubic yards was used to fill both approaches to the bridge. About 70 percent of the material was hauled across the bridge after its completion to fill the west approach. Some large

boulders found in the fill were taken out and used as riprap around the abutments and to protect the toes of the fill. Boulders for the riprap were discharged by dump trucks and rolled down the slope to the base of the bridge. A gas shovel was then lowered down to the stream bed and placed the stones where needed to protect the abutments and creek banks.[13]

All site work was completed on 21 July 1931. The bridge had been inspected six days earlier by R. B. Wright, Senior Highway Bridge Engineer for the Bureau of Public Roads.[14] Park Superintendent Tomlinson pronounced the work complete on 25 August, and the structure was accepted by the Department of the Interior on 21 September 1931.[15]

A 1963 inspection by N. B. Woods, Federal Highway Projects Engineer of the Bureau of Public Roads (at this point, a bureau of the U.S. Department of Commerce), revealed extensive damage caused by alkali action. Wood recommended a "heal and seal" waterproofing treatment and the replacement of the concrete curbs. He also noted some washout of material from the base of the east abutment, but did not recommend placing riprap, as the bridge had been designed with an adequate footing.[16]

Description

Fryingpan Creek Bridge is a three-hinged steel deck bridge with solid web arch girders and a reinforced concrete deck and steel handrail. The web arch is constructed from preassembled riveted plates reinforced by a net of girders and beams and stiffened with angle iron ribs. The concrete beam and slab approach abutments are faced with cement rubble masonry. All stones are of large size and vary considerably in color. The arch span is 127' 6" from center to center of bearings. The steel work utilizes web members constructed from riveted plates and angles; these prefabricated sections are joined to the abutments and at the crown of the arch by fabricated pin connections. These allow the bridge to flex considerably, and were probably required to deal with the extreme temperature variation. Two traffic lanes are carried by the deck, which measures 28' between curbs. The bridge is constructed on a 750' radius curve, with the approaches following the curve and the main span on a long chord to the curve. The structure is also superelevated on a 1:16 rise from north to south. Expansion joints are located on both ends and at the center of the steel arch.

The bridge is located on a sweeping curve four miles west of the White River Entrance and Ranger Station. The environment is characterized by dense stands of fir and spruce, although the stream bank, which is often prone to spring and summer flooding, is cloaked with small scrub alders. "Sentinel" firs are located at the ends of the bridge. Fryingpan Creek passes under the span in a series of braided channels. A parking area, bordered by low masonry walls, is located at the west end of the road, and provides access to a connector to the Wonderland Trail.

III. ENDNOTES

1. W. J. Utz, Assistant Highway Engineer, Bureau of Public Roads, District No. 1, "Final Construction Report (1930-31) on Frying Pan Creek Bridge, White River Road, East boundary-White River Crossing Section, Mt. Rainier National Park Project 3-A1," 1931, 1.

2. C. R. Short, Associate Highway Engineer, Bureau of Public Roads, "Location Survey Report (1932) on Yakima Park Highway, Route No. 3, Mt. Rainier National Park, State of Washington," (Portland, OR: Bureau of Public Roads, District No. 1, 1932), 7.

3. O. A. Tomlinson, Superintendent, Mount Rainier National Park, Superintendent's Monthly Report, November 1927, 1. MORA Archives, Box H2615, Superintendents' Monthly Reports 1924-1927 file.

4. Tomlinson, Superintendent's Monthly Report, March 1930, 4. MORA Archives, Box H2615, Superintendents' Monthly Reports 1928-1931 file; Tomlinson to Thomas C. Vint, Chief Landscape Engineer, National Park Service, 6 February 1928. MORA Archives, File D22, Construction Program 1928.

5. Vint to Dr. L. I. Hewes, Deputy Chief Engineer, Bureau of Public Roads, San Francisco, CA, 30 January 1928. MORA Archives, File D22, Construction Program 1928. For the original blueprints, see U.S. Department of the Interior, National Park Service, Landscape Engineering Division, "Rainier National Park, Frying Pan Bridge," construction drawing R-813, April 1928, in Engineering office files, Mount Rainier National Park.

6. Vint to Tomlinson, 20 April 1928. MORA Archives, File D22, Construction Program 1928.

7. Idem, Superintendent's Monthly Report, March 1930, 4. MORA Archives, Box H2615, Superintendents' Monthly Reports 1928-1931 file.

8. Utz, 1; Tomlinson, Superintendent's Monthly Report, July 1930, 13. MORA Archives, Box H2621, Superintendents' Annual Reports 1926-1932 file.

9. Utz, 2-3; Tomlinson, Superintendent's Monthly Report, August 1930, 9. MORA Archives, Box H2621, Superintendents' Annual Reports 1926-1932 file.

10. Utz, 3.

11. *Ibid.*, 1-3.

12. *Ibid.*, 3-4.

13. *Ibid.*, 2-3.

14. *Ibid.*, 1.

15. Tomlinson, Superintendent's Annual Report, 1931, 13. MORA Archives, Box H2621, Superintendents' Annual Reports 1926-1932 file; John H. Edwards, Assistant Secretary of the Interior, note on Arno B. Cammerer, Acting Director, National Park Service, to Secretary of the Interior, Memorandum, 19 September 1931. National Archives, RG 79 Box 1991 File 12/7 pt. 3, Mount Rainier National Park contracts.

16. N. B. Woods, Federal Highway Projects Engineer, Bureau of Public Roads, Portland, OR, memo to Western Office, Division of Design and Construction, National Park Service, San Francisco, 4 October 1963. MORA Archives, Box D30.

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--"Detail of Floor Beams and Stringers for Frying Pan Creek Bridge, U.S. Department of Agriculture. Construction drawing 817-2, July 1930.

--"Detail of Handrail for Frying Pan Creek Bridge, U.S. Department of Agriculture. Construction drawing 817-9, August 1930.

--"Detail of Sway Bracing for Frying Pan Creek Bridge, U.S. Department of Agriculture. Construction drawing 817-8, August 1930.

--"Detail of Truss 0-2 & 2-4 for Frying Pan Creek Bridge, U.S. Department of Agriculture. Construction drawing 817-3, August 1930.

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--"Detail of Truss Sections 4A-8ARL for Frying Pan Creek Bridge, U.S. Department of Agriculture. Construction drawing 817-6, August 1930.

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ADDENDUM TO
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